

Trend Study 1-18-01

Study site name: Bedke Spring.

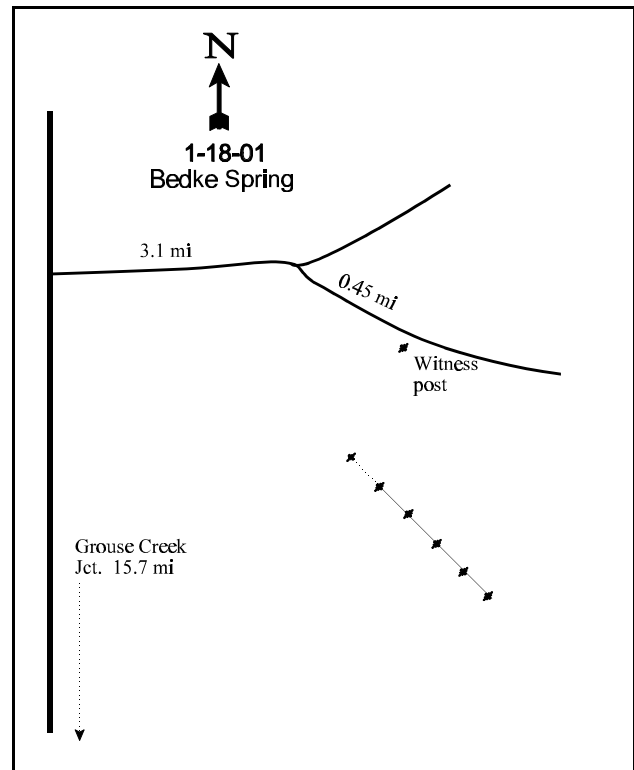
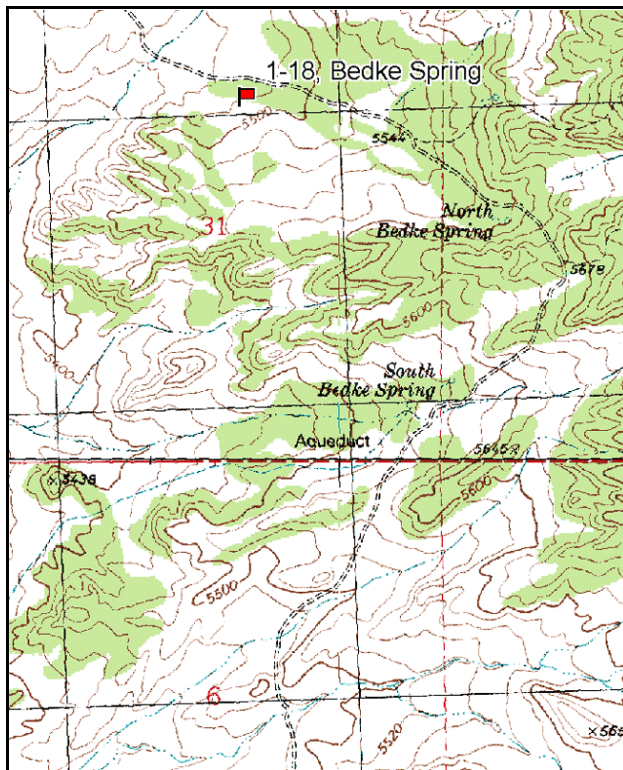
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline: 110 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From the Grouse Creek Junction on U-30 travel north for 15.7 miles. Turn right and travel east for 3.1 miles. Stay right and continue 0.45 miles to a witness post on the right hand side of the road. The baseline is approximately 300 feet in a southerly direction on a small bench. The baseline runs 110 degrees magnetic.



Map Name: Ingham Canyon

Diagrammatic Sketch

Township 11N, Range 17W, Section 31

UTM 4613021 N, 263661 E

DISCUSSION

Trend Study No. 1-18

The Bedke Spring trend study is a new site established in 1996. It samples a Wyoming big sagebrush flat surrounded by juniper and pinyon located just west of North Bedke Spring. The site has a gentle 3% to 5% slope with a west, northwest exposure and an elevation of approximately 5,640 feet. Cattle use the area during the spring (April 1-April 30) as part of the combined Red Butte\Pine Creek allotment which is grazed by 1,148 cattle and 5 horses. When the site was initially setup, there were numerous elk pellet groups around some of the juniper trees just north of the 0 foot baseline stake, yet few were encountered on the site. A pellet-group transect read on site in 2001 estimated 2 deer days use/acre (5 deer days use/ha) and 11 cow days use/acre (27 cow days use/ha).

The soil is relatively deep but very compacted making it difficult to probe with the soil penetrometer. Effective rooting depth (see methods) was estimated at 18 inches. Soil texture is a clay loam with few rocks on the surface or within the profile. Soil reaction is mildly alkaline (7.7 pH) with a low amount of phosphorus. The soil is light colored in the interspaces with little organic matter buildup in the surface horizon. There are large areas of unprotected bare soil (28-31% bare ground). Under the sagebrush canopies there is considerable cryptogamic development (12% in 2001). Water movement is evident on the surface and soil is pedestalled underneath shrubs. There are no active gullies on the site and erosion is not severe due to the gentle slope. The erosion condition class was determined to be slight to moderate in 2001.

The site is dominated by a relatively dense stand of Wyoming big sagebrush. Narrowleaf low rabbitbrush is also abundant. Density of big sagebrush was estimated at 3,360 plants/acre in 1996, with 68% classified as mature. Currently ('01), the population has increased dramatically to 16,340 plants/acre with only 8% classified as mature. The increase is due to the explosion of young plants which now account for 87% of the population. Utilization is mostly light with percent decadency going from 26% down to only 5%. There were a considerable number of dead plants sampled (1,040 plants/acre) in 1996, indicating a past die off. The percent dead within the population has dropped from 24% to 6% due to the increase in density. In 1996, the age class structure indicated a stable population. Currently, it would indicate an increasing population where the percent young has risen from 6% to 87%. One would expect to see many of the very dense population of young to decrease in number with the extended drought. During the 2001 sampling period, average annual leader growth for Wyoming big sagebrush was 1.3 inches which was 10% more than the average for the management unit.

Other shrubs contributing additional forage include small numbers of black sagebrush, a slightly expanding population of shadscale, and a few scattered spiny hopsage. Utilization of these shrubs is light with the exception of a few heavily hedged spiny hopsage which occur in very low numbers.

Narrowleaf low rabbitbrush (an increaser) is a co-dominant with Wyoming big sagebrush. It accounted for 43% of the shrub cover in 1996 with an estimated density of 6,600 plants/acre. Currently ('01), it only makes up 27% of the shrub cover and its density has decreased to 3,820 plants/acre. Percent decadence has gone from 2% up to 43%. The percentage of plants classified as mature has also decreased, while the height and crown measurements for mature plants has decreased. Greasewood and threadleaf rubber rabbitbrush are increasers also found on the site in very small numbers.

The herbaceous understory is fairly well developed for a Wyoming big sagebrush site. Grasses are fairly diverse and on average produce about 8% cover. The most abundant perennial species consist of Sandberg bluegrass, bottlebrush squirreltail, and bluebunch wheatgrass. Annual cheatgrass is also present, but produced less than 1% total cover in 1996. Currently, it has increased to 3.5% cover. In 1996 it made up only 5% of

the grass cover, now it contributes to 33% of the grass cover and has significantly increased in nested frequency. The forb composition is also diverse with 19 perennial and 10 annual species sampled since 1996. Hoods phlox is the most abundant forb, producing nearly 70% of the forb cover in 2001.

1996 APPARENT TREND ASSESSMENT

Soil trend appears stable with no serious erosion occurring. Protective ground cover is average for a Wyoming big sagebrush type. The key browse species, Wyoming big sagebrush, appears to have a stable population. Utilization is light, vigor good, and percent decadency is low. The population of the increaser, narrowleaf low rabbitbrush, appears stable with the majority (94%) of the shrubs classified as mature. The herbaceous understory is diverse and fairly abundant for a Wyoming big sagebrush type. It will likely not increase without a significant reduction in sagebrush canopy cover.

2001 TREND ASSESSMENT

Soil trend continues to be stable with the ratio of bare soil to protective cover remaining almost unchanged with no significant erosion occurring. Protective ground cover is average for a Wyoming big sagebrush type. The key browse species, Wyoming big sagebrush, currently appears to have an improving trend. Utilization continues to be light, vigor good, and percent decadency is low at only 5%. The number of young within the population has increased from only 200 plants/acre to an astounding 14,220 plants/acre. The population of the increaser, narrowleaf low rabbitbrush, appears to be decreasing (down by 42%) with percent decadence increasing from 2% to 43%. The herbaceous understory is fairly diverse and abundant for a Wyoming big sagebrush type. The sum of nested frequency value for perennial grasses and perennial forbs have both declined slightly while sum of nested frequency of annuals have increased for both grasses and forbs. Trend for herbaceous understory is slightly down.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --

Herd unit 01 , Study no: 18

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'96	'01	'96	'01	'96	'01
G	Agropyron cristatum	7	11	3	4	.30	.10
G	Agropyron smithii	30	21	14	9	.19	.12
G	Agropyron spicatum	51	*89	18	31	.72	1.11
G	Bromus tectorum (a)	115	*310	36	84	.30	3.50
G	Elymus spp.	10	*-	4	-	.12	-
G	Festuca spp.	2	-	1	-	.03	-
G	Poa fendleriana	2	-	1	-	.03	-
G	Poa secunda	216	218	76	78	2.92	4.32
G	Sitanion hystrix	135	*71	60	34	1.19	.89
Total for Annual Grasses		115	310	36	84	0.30	3.50
Total for Perennial Grasses		453	410	177	156	5.51	6.55
Total for Grasses		568	720	213	240	5.82	10.05
F	Allium acuminatum	1	13	1	5	.00	.03
F	Arabis spp.	5	1	3	1	.04	.03
F	Astragalus beckwithii	21	*43	9	18	.12	.59
F	Astragalus cibarius	35	*7	15	5	.20	.05
F	Astragalus utahensis	13	*5	9	1	.14	.00
F	Camelina microcarpa (a)	-	3	-	3	-	.01
F	Castilleja spp.	2	-	1	-	.03	-
F	Chaenactis douglasii	23	*3	11	1	.05	.00
F	Collomia linearis (a)	4	-	2	-	.01	-
F	Collinsia parviflora (a)	32	*10	16	4	.10	.02
F	Cordylanthus ramosus (a)	2	-	1	-	.00	-
F	Crepis acuminata	-	1	-	1	-	.00
F	Cryptantha spp.	12	*-	8	-	.06	-
F	Delphinium nuttallianum	-	4	-	2	-	.01
F	Descurainia pinnata (a)	11	*122	3	55	.01	.42
F	Erigeron spp.	-	6	-	2	-	.18
F	Eriogonum spp.	-	1	-	1	-	.00
F	Eriogonum ovalifolium	1	3	1	1	.00	.00
F	Erigeron pumilus	50	*10	18	4	.34	.02
F	Gilia spp. (a)	2	*29	2	15	.01	.10
F	Lathyrus brachycalyx	-	1	-	1	-	.00
F	Lappula occidentalis (a)	22	*77	13	26	.06	.13

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'96	'01	'96	'01	'96	'01
F	Microsteris gracilis (a)	-	*33	-	16	-	.08
F	Penstemon cyananthus	24	*-	10	-	.25	-
F	Phlox hoodii	240	240	82	80	6.65	8.27
F	Phlox longifolia	67	52	30	22	.32	.45
F	Ranunculus testiculatus (a)	11	*196	3	59	.01	1.57
F	Unknown forb-annual (a)	4	-	2	-	.03	-
F	Unknown forb-perennial	-	4	-	2	-	.01
Total for Annual Forbs		88	470	42	178	0.26	2.34
Total for Perennial Forbs		494	394	198	147	8.22	9.67
Total for Forbs		582	864	240	325	8.48	12.01

* Indicates significant difference at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --

Herd unit 01 , Study no: 18

T y p e	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia nova	1	3	.76	.03
B	Artemisia tridentata wyomingensis	76	70	7.83	6.91
B	Atriplex confertifolia	23	33	.31	1.22
B	Chrysothamnus nauseosus consimilis	2	1	-	.03
B	Chrysothamnus viscidiflorus stenophyllus	86	70	7.31	3.35
B	Grayia spinosa	0	1	.30	-
B	Opuntia spp.	7	14	.15	.06
B	Sarcobatus vermiculatus	2	2	.38	.78
Total for Browse		197	194	17.04	12.40

BASIC COVER --

Herd unit 01 , Study no: 18

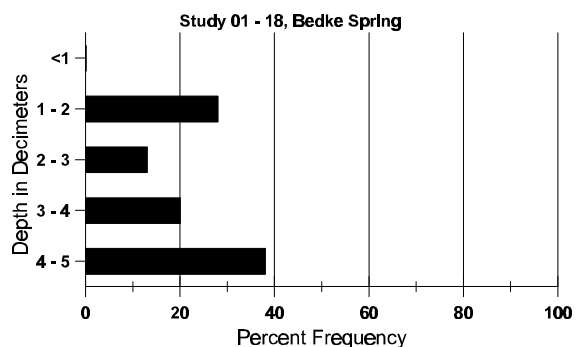
Cover Type	Nested Frequency		Average Cover %	
	'96	'01	'96	'01
Vegetation	409	448	29.98	34.56
Rock	198	111	2.48	.67
Pavement	334	387	6.25	10.18
Litter	483	423	28.97	22.69
Cryptogams	189	204	7.75	12.10
Bare Ground	389	393	27.96	31.32

SOIL ANALYSIS DATA --

Herd Unit 01, Study no: 18, Bedke Spring

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
18.0	57.2 (16.6)	7.7	36.7	30.0	33.3	2.2	5.4	387.2	.6

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 01 , Study no: 18

Type	Quadrat Frequency		Pellet Transect	
	'96	'01	Pellet Groups per Acre '01	Days Use per Acre (ha) '01
Rabbit	7	2	17	N/A
Elk	3	-	-	-
Deer	6	1	26	2 (5)
Cattle	1	3	130	11 (27)

BROWSE CHARACTERISTICS --

Herd unit 01 , Study no: 18

A G R E	Y R	Form Class (No. of Plants)										Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4	Ht.		Cr.		
Artemisia nova																			
M	96	-	1	-	-	-	-	-	-	-	1	-	-	-	20	10	26	1	
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40	13	24	2	
D	96	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1	
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1	
X	96	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>					
'96		100%				00%				00%				+33%					
'01		00%				00%				00%									
Total Plants/Acre (excluding Dead & Seedlings)												'96	40	Dec:	50%				
												'01	60		33%				
Artemisia tridentata wyomingensis																			
S	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1	
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2	
Y	96	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10	
	01	710	-	-	1	-	-	-	-	-	710	-	1	-	14220			711	
M	96	106	9	-	-	-	-	-	-	-	115	-	-	-	2300	22	31	115	
	01	58	4	-	-	-	-	-	-	-	60	2	-	-	1240	22	28	62	
D	96	26	11	-	4	2	-	-	-	-	34	-	2	7	860			43	
	01	39	2	-	3	-	-	-	-	-	27	-	-	17	880			44	
X	96	-	-	-	-	-	-	-	-	-	-	-	-	-	1040			52	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	1100			55	
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>					
'96		13%				00%				05%				+79%					
'01		.73%				00%				02%									
Total Plants/Acre (excluding Dead & Seedlings)												'96	3360	Dec:	26%				
												'01	16340		5%				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Atriplex confertifolia																		
S	96 01	10 1	- -	- -	- -	- -	- -	- -	- -	- -	10 1	- -	- -	- -	200 20		10 1	
Y	96 01	41 39	- -	- -	3 -	- -	- -	- -	- -	- -	44 39	- -	- -	- -	880 780		44 39	
M	96 01	9 40	- -	- -	4 19	1 -	- -	- 1	- -	- -	14 60	- -	- -	- -	280 1200	8 8	10 15	
D	96 01	- -	- -	- -	- 1	- -	- -	- 1	- -	- -	- 2	- -	- -	- -	0 40		0 2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'96		02%			00%			00%			+43%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'96 '01	1160 2020	Dec:	0% 2%			
Chrysothamnus nauseosus consimilis																		
Y	96 01	- -	- -	- -	1 -	- -	- -	- -	- -	- -	1 -	- -	- -	- -	20 0		1 0	
M	96 01	1 1	- -	- -	- -	- -	- -	- -	- -	- -	1 1	- -	- -	- -	20 20	21 24	31 49	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'96		00%			00%			00%			-50%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'96 '01	40 20	Dec:	- -			
Chrysothamnus viscidiflorus stenophyllus																		
S	96 01	1 17	- -	- -	- -	- -	- -	- -	- -	- -	1 17	- -	- -	- -	20 340		1 17	
Y	96 01	10 11	1 -	- -	- -	- -	- -	- -	- -	- -	11 11	- -	- -	- -	220 220		11 11	
M	96 01	300 90	- -	- -	11 6	- -	- -	- 1	- -	- -	311 97	- -	- -	- -	6220 1940	11 9	15 13	
D	96 01	7 80	1 -	- -	- 3	- -	- -	- -	- -	- -	7 54	- 3	1 -	- 26	160 1660		8 83	
X	96 01	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0 320		0 16	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'96		.60%			00%			.30%			-42%							
'01		00%			00%			14%										
Total Plants/Acre (excluding Dead & Seedlings)												'96 '01	6600 3820	Dec:	2% 43%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Grayia spinosa																		
Y	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18 40	0	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15 25	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'96		00%			00%			00%										
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'96	0	Dec:	-			
												'01	20		-			
Opuntia spp.																		
S	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
Y	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	96	4	-	-	1	-	-	-	-	-	5	-	-	-	100	5 9	5	
	01	7	-	-	1	-	-	5	-	-	13	-	-	-	260	4 7	13	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'96		00%			00%			00%			+53%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'96	140	Dec:	-			
												'01	300		-			
Sarcobatus vermiculatus																		
Y	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
	01	-	-	-	2	-	-	-	-	-	2	-	-	-	40		2	
M	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26 33	0	
	01	-	-	-	1	-	-	-	-	-	1	-	-	-	20	38 57	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'96		00%			00%			00%			-25%							
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'96	80	Dec:	-			
												'01	60		-			